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COMPLETE SPECIFICATION.

Improvements in Vaporizing Apparatus for Medical Purposes.

I, Herbert Franklin Williams, of 450 Clasoon Avenue Brooklyn, County of Kings, State of New York, United States of America, Doctor of Medicine, do hereby declare the nature of my invention for "Improvements in vaporizing apparatus for medical purposes" and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention is an apparatus for the administration of medicine in a vaporized form, or of air or other gas impregnated with such medicinal vapor. The construction of my apparatus is such that I can regulate the temperature of the vapor or impregnated air at will, and the vaporizing chamber itself is constructed on a novel principle, in that the air, instead of being forced through the liquid, or instead of being mingled with a spray drawn directly from the liquid body by any means, is projected down upon the liquid surface, and there mingles with the vapor rising from said surface, and finally escapes from the vaporizing chamber by any suitable conduit which may lead directly to the patient who is to receive the treatment. Included in my apparatus is a form of hood or cover for the mouth and nose of the patient, which will fit closely to the contour of the face, and prevent the mingling of the external air with the medicated air or vapor yielded by the apparatus.

In the accompanying drawings, Fig. 1 is a side elevation of my apparatus showing certain portions in vertical section. Fig. 2 is a sectional view of the hood for the face of the patient. Similar letters of reference indicate like parts.

The air or gas which is to be mingled with the vapor produced, enters the apparatus at A, which is a tube, which may communicate with a reservoir containing compressed air. I have found it exceedingly beneficial to carry this tube directly through the casing of the window, and so out of doors, so that in this way, pure, fresh air may be drawn directly into the apparatus, without exposing the body of the patient to the external temperature. It will be readily understood, that the patient may remain in his apartment fully protected from draughts, &c., and in the manner described be able to obtain all the advantages incident to the breathing of fresh atmospheric air. After entering at the point A, the air to be medicated is passed through a drying tube B, which may be filled with chloride of calcium, or any other material for absorbing moisture therefrom. After being thus dried, the air passes by the tube C to a heating drum D, which is placed in proximity to a lamp E, or any other suitable source of heat. In case it is desired to cool the air instead of heating it, the drum D may be surrounded by ice, or any suitable freezing mixture. The tube C communicates with drum D by pipes, F and G, in which pipes are arranged valves H and I. A valve J is also arranged in the tube C between the tubes F and G. When the valve J is closed, the air is forced to circulate through the drum D, the valves H and I then being open. If the valves H and I are closed, and the valve J be open, then obviously the air will not pass through the drum D. By suitable adjustments of the valves H, I, and J, any portion of the air current may be made to pass through the drum D, and in this way, the temperature of the air passing to the vaporizing chamber may be nicely regulated. K is the vaporizing chamber preferably of glass and hermetically sealed above. In this chamber is placed the liquid L or other material which is to be vaporized. The tube C enters this chamber but terminates above the surface of the liquid. At the end of the tube C, is a bulb M which is perforated, and which serves to break up or diffuse the air current above the surface of the liquid L. Also entering the chamber K, is a tube N, the extremity of which may also be a perforated bulb O. This tube serves to convey the mingled vapor and air to the patient, or wherever else it is to be utilized. The vaporizing chamber K is here shown placed in a heating cylinder P, which is closed on its upper side Q, and provided below with a perforated partition R. Beneath the cylinder is placed a lamp or other source of heat S, the flame from which passes up through the perforated plate R and cylinder P, and finally escapes at the openings S in said cylinder.

The operation of the apparatus above described is as follows. It will be observed, First, that I may heat the air proceeding from pipe A to the vaporizing chamber to any desired temperature, and may project it upon the surface of the liquid or other material in the vaporizing chamber K, without heating said chamber or the liquid therein ; and in such case, sufficient vapor may be generated from the liquid by the heat of the incoming air only ; or, Second, I may heat the vaporizing chamber only, and not heat the incoming air. In such case, a comparatively cold current of air will mingle with the vapor produced by heat applied to the material in the chamber ; or, Third, I may heat both the incoming air and the vaporizing chamber, and thus cause a high elevation of temperature of the material to be vaporized. This course will probably be followed with substances the vaporization of which is difficult at low temperatures ; Fourth, in lieu of heating the incoming air, I may cool it, and so project a current of cold air upon a substance in the chamber L, which, of course, in that case, will not be heated ; Fifth, I may pack the chamber K in ice or a freezing mixture, and so direct a current of air of normal temperature against a cold liquid or other material with which it is desired to bring it in contact ; Sixth, I may cool both incoming air and the chamber K, and in such case, obtain a final current of as low temperature as may be desired; Seventh, I may omit the source of cold and heat altogether, and draw in fresh air from the outer atmosphere into the chamber K, in which I may place any liquid or other material with which it may be of advantage to have that air come in contact before it reaches the patient. Such, for example, as a disinfecting or antiseptic substance or solution. The drying tube B is, of course, not essential to my invention, or in lieu of any drying substance therein, I may place at all times, a disinfecting or antiseptic material. The preliminary heating of the air before it goes to the vaporizing chamber, has the double advantage of causing the air to act more rapidly upon the material to be vaporized, and also of destroying any germs in the air which may be destructible by the high temperature attained. I have found this apparatus of special value in the administration of all mendicaments usually administered by inhalation including the anaesthetics.

In order to increase the efficiency of the apparatus, I apply thereto the shield or hood represented at T, in Fig. 1, and separately in Fig. 2. (section) the object of which is to prevent the patient breathing any air except that which comes through the vaporizing chamber. This hood consists of a flexible rubber cone or funnel, U, to the edge of which is applied a ring of soft, flexible wire V such as lead or other non-elastic, easily bent material. After the cone is placed over the patient's nose and mouth, the wire is easily bent over the bridge of the nose, and to follow the contour of the cheeks and chin, so that the edge of the cone may fit closely thereon, and the access of outer air be prevented. I find this simple device to be a material improvement over the usual means now employed for the administration of anaesthetics.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1. A closed vaporizing chamber adapted to contain a liquid or other substance to be vaporized, a tube entering said chamber and terminating above said substance, and arranged to deliver an air current upon said substance, and an exit opening in said chamber for the vapor produced therein.

2. A closed vaporizing chamber adapted to contain a liquid or other substance to be vaporized, means for heating or cooling said chamber, a tube entering said chamber, and terminating above said substance, and an exit opening in said chamber for the vapor produced therein.

3. A closed vaporizing chamber adapted to contain a liquid or other substance to be vaporized, a tube entering said chamber and terminating above said substance, and

arranged to deliver an air current upon said substance, a chamber communicating with said tube, and means for heating or cooling the air passing from said tube through said chamber, and an exit opening in said vaporizing chamber for the vapor produced therein.

4. The vaporizing apparatus herein set forth containing inlet tube A C, chamber D, and means of heating the same, valves H, I, J, the vaporizing chamber K, and a means of heating the same and exit tube N, substantially as described.

5. A hood or cone of flexible material for covering the mouth and nose of the patient, having on its edge a flexible non-elastic band, substantially as described.

Dated this Twenty fifth day of April 1889.

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WILLIAMS' COMPLETE SPECIFICATION.

(1 SHEET)

[This Drawing is a reproduction of the Original on a reduced scale]

Fig. 1.

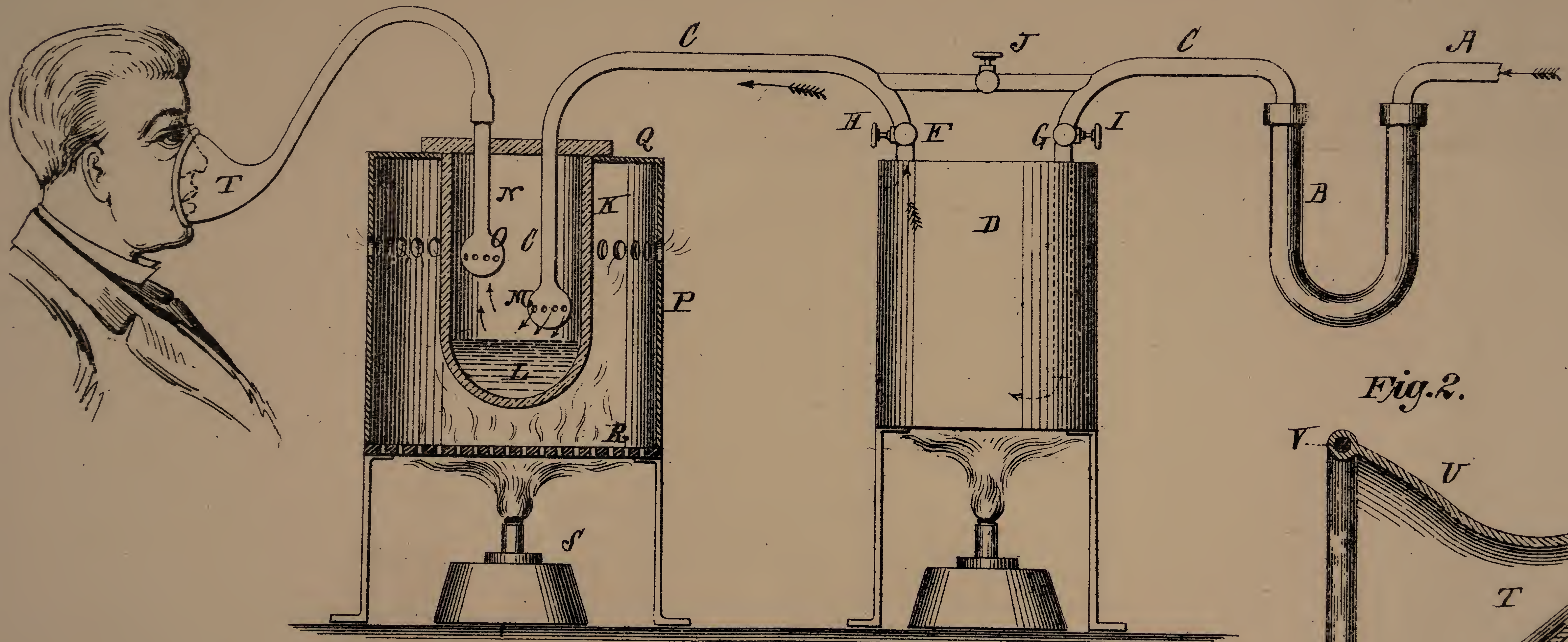
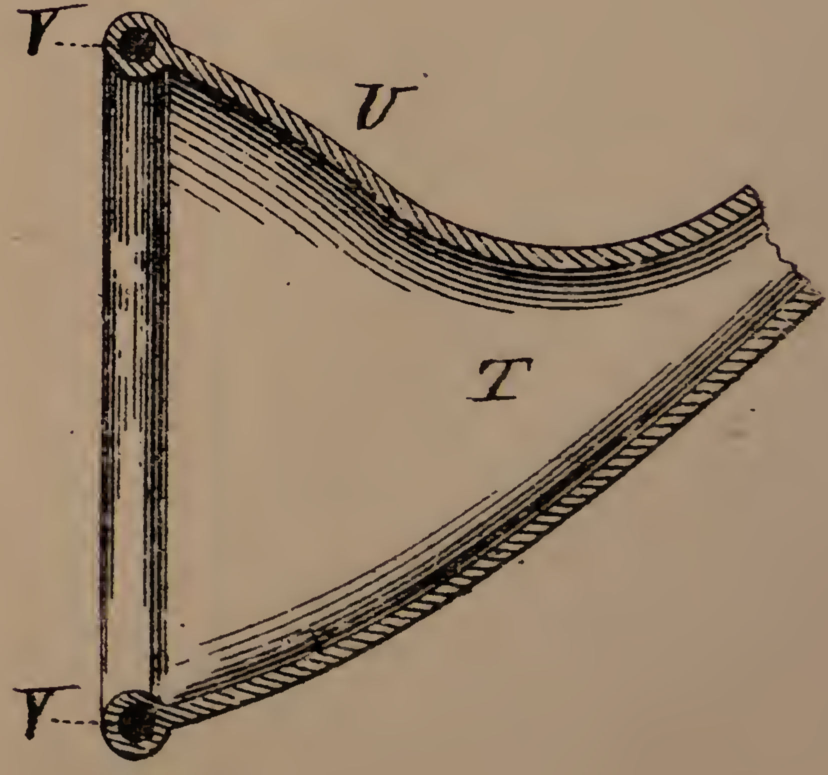


Fig. 2.



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